



COMPONENT MAINTENANCE MANUAL

TEMPERATURE SENSOR

Part Number
B7030

Issued by
SCIENTIFIC INSTRUMENTS, INC.
4400 W. Tiffany Drive
West Palm Beach, FL 33407
USA

Tel (561) 881-8500
Fax (561) 881-8556



COMPONENT MAINTENANCE MANUAL
B7030

SERVICE BULLETIN LIST

SERVICE BULLETIN	DATE INSERTED	REV.	SUBJECT



COMPONENT MAINTENANCE MANUAL
B7030

LIST OF EFFECTIVE PAGES

	PAGE	DATE		PAGE	DATE
Title Page	1	Dec 9/2003	Testing and fault isolation	2	Dec 9/2003
	2	BLANK		3	
Record of revisions	1	Dec 9/2003		4	
	2	BLANK		5	
Record of temporary revisions	1	Dec 9/2003	Disassembly	6	
	2	BLANK		7	Dec 9/2003
Service Bulletin List	1	Dec 9/2003	Cleaning	7	Dec 9/2003
	2	BLANK	Check	7	Dec 9/2003
List of effective pages	1	Dec 9/2003	Repair	7	Dec 9/2003
	2	BLANK	Assembly including storage	7	Dec 9/2003
Table of Contents	1	Dec 9/2003		8	
	2	BLANK	Fits and clearances	8	Dec 9/2003
Introduction	1	Dec 9/2003	Special tools, fixtures and equipment	8	Dec 9/2003
	2	BLANK			
Description and operation	1	Dec 9/2003	Illustrated parts list	8	Dec 9/2003
Specifications	1	Dec 9/2003			
	2				



COMPONENT MAINTENANCE MANUAL
B7030

TABLE OF CONTENTS

DESCRIPTION AND OPERATION.....	1
SPECIFICATIONS.....	1
TESTING AND FAULT ISOLATION.....	2
DISASSEMBLY.....	7
CLEANING.....	7
CHECK.....	7
REPAIR.....	7
ASSEMBLY INCLUDING STORAGE.....	7
FITS AND CLEARANCES.....	8
SPECIAL TOOLS, FIXTURES, AND EQUIPMENT.....	8
ILLUSTRATED PARTS LIST.....	8



COMPONENT MAINTENANCE MANUAL
B7030

INTRODUCTION

This manual describes the general configuration the Cockpit Rate-of-Change/High Limit Temperature Sensor, Model B7030, manufactured by Scientific Instruments, Inc. Identification data, including part number, serial number, and FAA-PMA data, is engraved on the body of the unit.

This manual is divided into separate sections:

Title Page	Testing and Fault Isolation
Record of Revisions	Disassembly
Record of Temporary Revisions	Cleaning
Service Bulletin Information List	Check
List of Effective Pages	Repair
Table of Contents	Assembly including Storage
Introduction	Fits and Clearances
Description and Operation	Special Tools, Fixtures, and Equipment
Specifications	Illustrated Parts List

Refer to the Table of Contents for the page location of applicable sections.

The quantities in this manual are expressed in English units followed by S.I. units in parenthesis.

This manual will be revised as necessary to reflect current information.



COMPONENT MAINTENANCE MANUAL B7030

DESCRIPTION AND OPERATION

1. DESCRIPTION

The Cockpit Rate-of-Change/High-Limit Temperature Sensor is a dual-function unit in that it furnishes both rate-of-change and high-limit sensing. In addition, a built-in thermal lag provides for dampened response in the rate-of-change circuit.

Physically, the unit consists of three sensing element groups comprised of a number of calibrated thermistors. These thermistors are terminated on a 6-pin hermetically sealed, bayonet/coupling receptacle, which connects to an external temperature control system. Mounting of the unit in the aircraft is accomplished via an external - 7/8-14 threaded section and hex head configuration as illustrated in Figure 1.

2. OPERATION

Two of the thermistors furnish rate-of-change data. One of these is thermally impeded by virtue of the fact that is located within an inner cavity. The other rate-of-change thermistor is exposed to the ambient temperature by four slots, which are equally spaced around the body of the probe.

High-limit temperature sensing is furnished via two thermistors wired in series. Like the exposed rate-of-change thermistor, these are exposed to the ambient temperature by four slots mentioned previously.

The thermistor-to-receptacle connections are as illustrated in Figure 1.

3. SPECIFICATIONS

Operating Ambient Temperature Range	-65 °F to +160 °F (-54 °C to +71 °C)
-------------------------------------	--------------------------------------

Nominal Sensor Resistance	
a) Rate-of-Change	2037 ± 61 ohms @ 110 °F (43 °C)
b) High-Limit Elements	7430 ±223 ohms @ 110 °F (43 °C)

Receptacle	MS3113H106P (or equivalent per MIL-C-26482)
------------	--

*Mating Bayonet Plug	MS3116E106S
----------------------	-------------

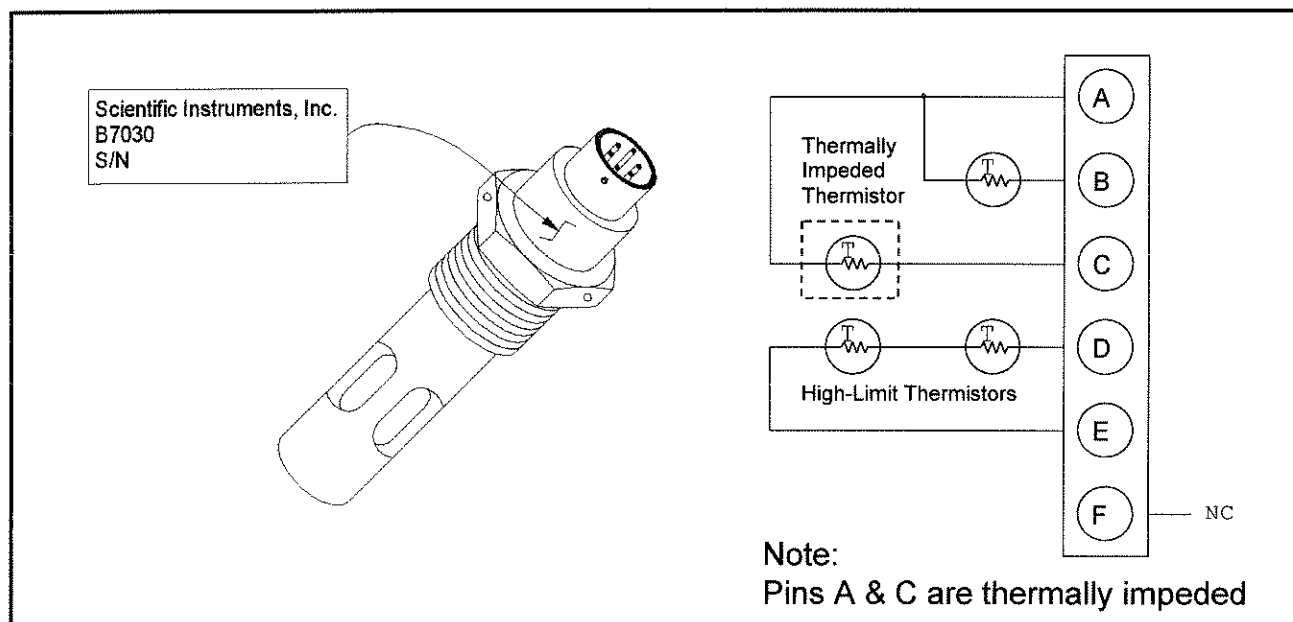


COMPONENT MAINTENANCE MANUAL B7030

Size:

Probe Diameter:	.692 in. (17.58 mm) (NOM)
Overall Length	3.75 in. (95.25 mm) maximum
Mounting Thread:	7/8 – 14 UNF – 3A
Mounting Hexagon:	1.06 in. (26.92 mm) (NOM)

- * This plug is listed for test purposes only, and is not necessarily used on the aircraft.



Outline and Schematic Drawing
Figure 1

TESTING AND FAULT ISOLATION

4. TESTING AND FAULT ISOLATION

The data that follows permits the testing of the sensor to insure correct operation.

B. Special Tools and Test Equipment:



COMPONENT MAINTENANCE MANUAL
B7030

- 1) A megohmmeter capable of reading 5 megohms and greater at 500 VDC (AEMC Model 1000, or equivalent)
- 2) Temperature-controlled environmental test chamber. Accuracy 1%.
- 3) Thermometer with temperature accuracy $\pm 0.2^{\circ}\text{F}$ ($\pm 0.11^{\circ}\text{C}$)
- 4) Ohmmeter with:

Current: $<0.1\text{ mA}$

Accuracy: 0.05%

Range: 0-100 $\text{K}\Omega$

C. Visual Check

- 1) Visually check the sensor for obvious damage.

D. Insulation Resistance

- 1) Using the megohmmeter, measure the resistance between all pins and the housing. The readings should exceed 5 megohms at 500 VDC.

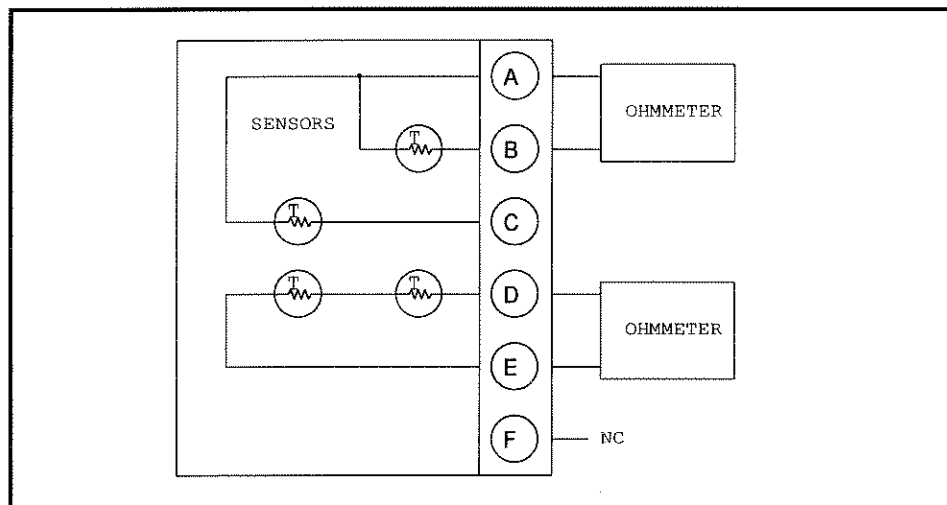
E. Electrical Test

- 1) Connect the Ohmmeter to pins A & B of the temperature sensor. Hold the sensor at a temperature of $77^{\circ}\text{F} \pm 3^{\circ}\text{F}$ ($25^{\circ}\text{C} \pm 1.8^{\circ}\text{C}$), within the environmental test chamber. With the thermometer at a stable temperature and located within approximately 1/2 in. (12.7 mm) of the tip of the sensor, measure the temperature. Compare this value to that indicated on Figure 3. The value must be within the limits shown on the drawing.
- 2) Connect the Ohmmeter to pins A & C of the temperature sensor. Hold the sensor at a temperature of $77^{\circ}\text{F} \pm 3^{\circ}\text{F}$ ($25^{\circ}\text{C} \pm 1.8^{\circ}\text{C}$), within the environmental test chamber. With the thermometer at a stable temperature and located within approximately 1/2 in. (12.7 mm) of the tip of the sensor, measure the temperature. Compare this value to that indicated on Figure 3. The value must be within the limits shown on the drawing.



COMPONENT MAINTENANCE MANUAL
B7030

- 3) Increase the temperature of the test chamber to $110^{\circ}\text{F} \pm 3^{\circ}\text{F}$ ($43.3^{\circ}\text{C} \pm 1.8^{\circ}\text{C}$), within the environmental test chamber. Retest pins A & B and A & C. Compare this value to that indicated on Figure 4. The value must be within the limits shown on the drawing.
- 4) Connect the Ohmmeter to pins D & E of the temperature sensor. Hold the sensor at a temperature of $110^{\circ}\text{F} \pm 3^{\circ}\text{F}$ ($43.3^{\circ}\text{C} \pm 1.8^{\circ}\text{C}$), within the environmental test chamber. With the thermometer at a stable temperature and located within approximately 1/2 in. (12.7 mm) of the tip of the sensor, measure the temperature. Compare this value to that indicated on Figure 5. The value must be within the limits shown on the drawing.
- 5) Increase the temperature of the test chamber to $145^{\circ}\text{F} \pm 3^{\circ}\text{F}$ ($62.8^{\circ}\text{C} \pm 1.8^{\circ}\text{C}$), within the environmental test chamber. With the thermometer at a stable temperature and located within approximately 1/2 in. (12.7 mm) of the tip of the sensor, measure the temperature. Compare this value to that indicated on Figure 6. The value must be within the limits shown on the drawing.

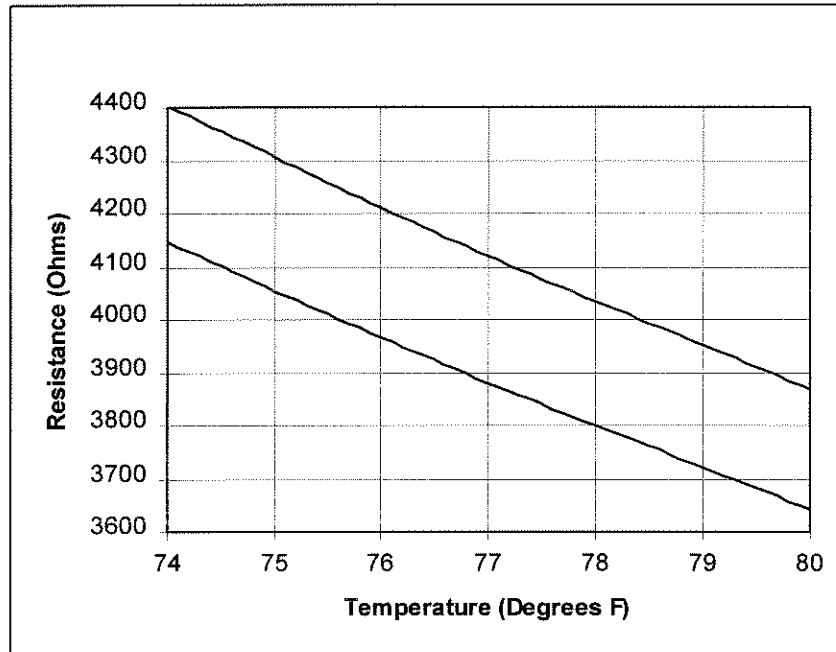


Schematic for Electrical Test

Figure 2

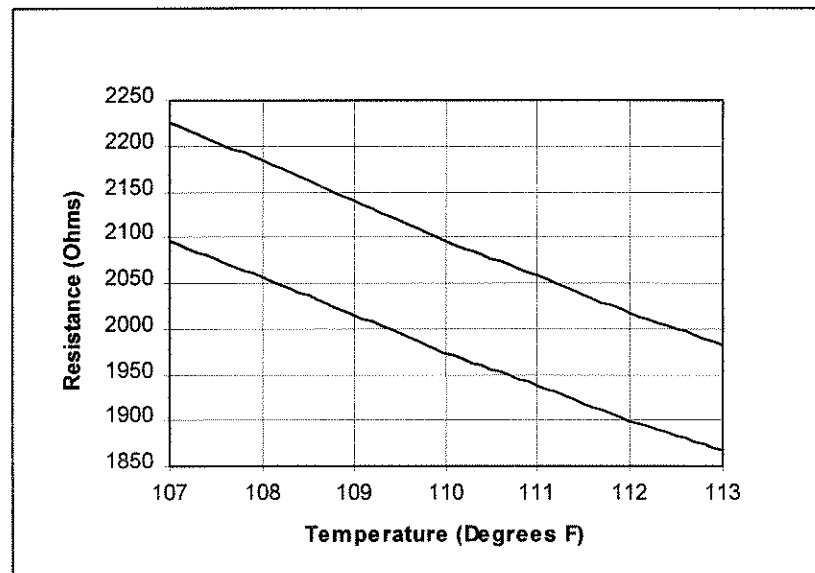


COMPONENT MAINTENANCE MANUAL
B7030



Resistance vs Temperature

Figure 3

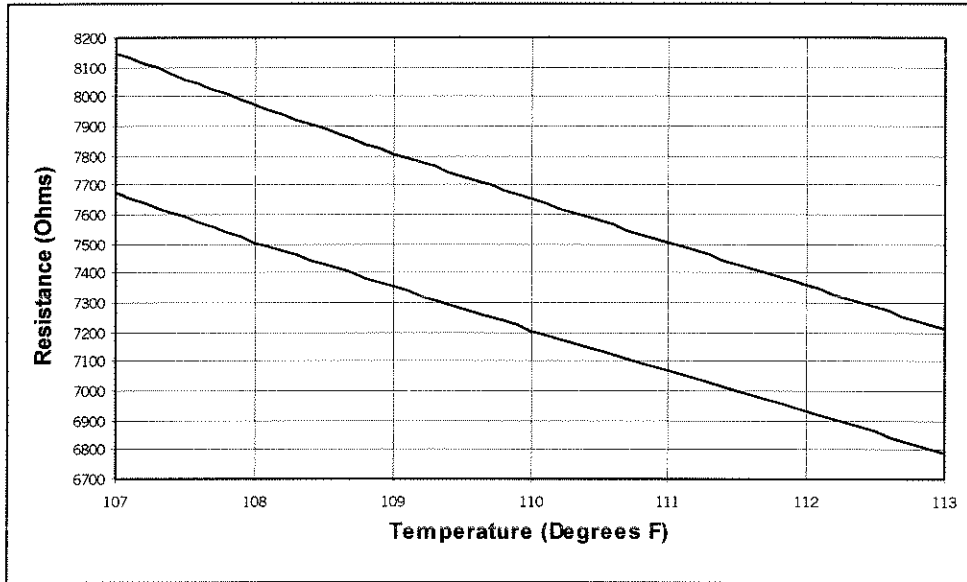


Resistance vs Temperature

Figure 4

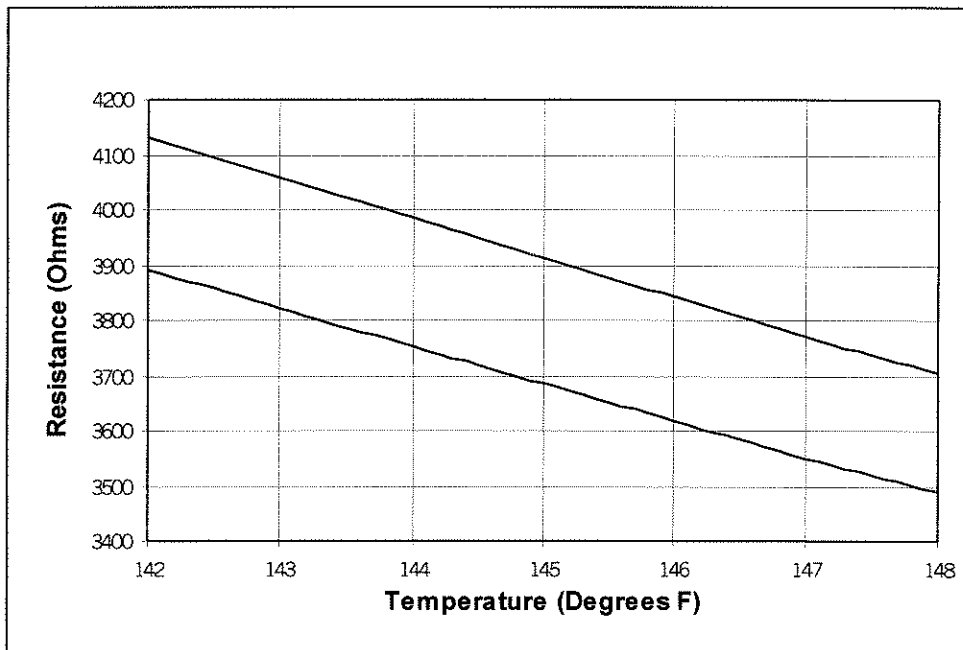


COMPONENT MAINTENANCE MANUAL
B7030



Resistance vs Temperature

Figure 5



Resistance vs Temperature

Figure 6



COMPONENT MAINTENANCE MANUAL
B7030

5. DISASSEMBLY

NOT APPLICABLE

6. CLEANING

- A. Remove dirt, stains, moisture, etc. with a clean, dry, lint-free cloth.
- B. Use a soft bristle brush moistened in isopropyl alcohol to remove any foreign matter from between the receptacle pins.

7. CHECK

- A. Visually inspect the sensor probe for obvious wear or damage.
- B. Check for bent, broken or missing receptacle pins.
- C. Check probe housing for scratches or cracks.

8. REPAIR

The temperature sensor is considered non-repairable. Bent receptacle pins may be carefully straightened. For other defects or incorrect operation, the temperature sensor should be discarded.

9. ASSEMBLY INCLUDING STORAGE

A. Assembly

Not Applicable

B. Storage

- (1) Install a protective cap on the electrical connector.
- (2) The sensor must be stored in a clean and dry room open to the air. The temperature must be between 64°F and 82°F (18°C and 28°C) and the relative humidity between 25% and 65%.
- (3) Keep the sensor in its initial packaging. If other containers are put on the sensor container, be careful to prevent damage caused by too much weight.



COMPONENT MAINTENANCE MANUAL
B7030

(4) Do not keep the sensor near heat, fluids or other sources that can cause corrosion.

10. FITS AND CLEARANCES

No dimensional check of the sensor is necessary.

11. SPECIAL TOOLS, FIXTURES AND EQUIPMENT

No other special tools are necessary.

12. ILLUSTRATED PARTS LIST

Since the unit is non-repairable, no parts list is provided.